We claim:

1. A method of generating an output signal from a compensator for controlling an actuator, the method comprising:

providing to the compensator a first time-dependent signal w(t);

providing to the compensator a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, u(t), wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t)B(f(x(t))) ,$$

where S(f(x(t))) represents a restoring force and B(f(x(t))) represents a motor factor, and both are univariate functions; and

outputting the third signal u(t).

2. A method of generating an output signal from a compensator for controlling an electromechanical device, the method comprising:

providing to the compensator a first time-dependent signal w(t);

providing to the compensator a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, u(t), wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t)B(f(x(t))) ,$$

where $S(f(x(t)))$ represents a restoring force and $B(f(x(t)))$ represents a motor factor, and both are univariate functions; and

outputting the third signal $u(t)$.

3. A method of generating an output signal from a compensator for controlling an audio reproduction system, the method comprising:

providing to the compensator a first time-dependent signal $w(t)$;

providing to the compensator a second, position-dependent signal $f(x(t))$, where $x(t)$ is a measure of a position of a first portion of the audio reproduction system with respect to a second portion of the audio reproduction system;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, $u(t)$, wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t)B(f(x(t))) ,$$

where $S(f(x(t)))$ represents a restoring force and $B(f(x(t)))$ represents a motor factor, and both are univariate functions; and

outputting the third signal $u(t)$.

4. The process according to Claim 1, wherein the function $S(f(x(t)))$ is derived in part from a position-dependent restoring force acting upon an element of the actuator.

5. The process according to Claim 4, wherein $S(f(x(t)))$

is the subtracted version represented by equation (36a).

6. The process according to Claim 2, wherein the function S(f(x(t))) is derived in part from a position-dependent restoring force acting upon an element of the electromechanical device.

7. The process according to Claim 6, wherein S(f(x(t))) is the subtracted version represented by equation (36a).

8. The process according to Claim 3, wherein S(f(x(t))) is derived from a ratio of the voice-coil restoring force to a motor factor of the voice-coil.

9. The process according to Claim 8, wherein S(f(x(t))) is the subtracted version represented by equation (36a).

10. The process according to Claim 1, wherein B(f(x(t))) is derived from a motor factor of the actuator.

11. The process according to Claim 10, wherein the actuator motor factor is a drive force acting upon an element of the actuator for a fiducial value of an electric current driving the actuator.

12. The process according to Claim 2, wherein B(f(x(t))) is derived from a motor factor of the electromechanical device.

13. The process according to Claim 12, wherein the motor factor of the electromechanical device is the electromagnetic drive force acting upon an element of the electromechanical device for a fiducial value of the electric current driving the electromechanical device.

14. The process according to Claim 3, wherein B(f(x(t)))

is derived from a motor factor of the voice coil transducer.

15. A method of generating an output signal from a compensator for controlling an actuator, the method comprising:

providing to the compensator a first time-dependent signal w(t);

providing to the compensator a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, u(t), wherein the modifying implements the following control law:

$$u(t) = w(t)B(f(x(t))),$$

where B(f(x(t))) represents a motor factor; and

outputting the third signal u(t).

16. A method of generating an output signal from a compensator for controlling an electromechanical device, the method comprising:

providing to the compensator a first time-dependent signal w(t);

providing to the compensator a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, u(t), wherein the modifying implements the following control law:

$$u(t) = w(t)B(f(x(t))),$$

where $B(f(x(t)))$ represents a motor factor; and outputting the third signal $u(t)$.

17. A method of generating an output signal from a compensator for controlling an audio reproduction system, the method comprising:

providing to the compensator a first time-dependent signal $w(t)$;

providing to the compensator a second, position-dependent signal $f(x(t))$, where $x(t)$ is a measure of a position of a first portion of the audio reproduction system with respect to a second portion of the audio reproduction system;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, $u(t)$, wherein the modifying implements the following control law:

$$u(t) = w(t)B(f(x(t))),$$

where $B(f(x(t)))$ represents a motor factor; and outputting the third signal $u(t)$.

18. The process according to Claim 15, wherein $B(f(x(t)))$ is derived from a motor factor of the actuator.

19. The process according to Claim 18, wherein the actuator motor factor is a drive force acting upon an element of the actuator for a fiducial value of an electric current driving the actuator.

20. The process according to Claim 17, wherein $B(f(x(t)))$ is derived from a motor factor of the electromechanical device.

21. The process according to Claim 20, wherein the motor factor of the electromechanical device is the electromagnetic drive force acting upon an element of the electromechanical device for a fiducial value of the electric current driving the electromechanical device.

22. The process according to Claim 17, wherein $B(f(x(t)))$ is derived from a motor factor of the voice coil transducer.

23. A method of generating an output signal from a compensator for controlling an actuator, the method comprising:

providing to the compensator a first time-dependent signal $w(t)$;

providing to the compensator a second, position-dependent signal $f(x(t))$, where $x(t)$ is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, $u(t)$, wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t),$$

where $S(f(x(t)))$ represents a restoring force; and

outputting the third signal $u(t)$.

24. A method of generating an output signal from a compensator for controlling an electromechanical device, the method comprising:

providing to the compensator a first time-dependent signal $w(t)$;

providing to the compensator a second, position-dependent signal $f(x(t))$, where $x(t)$ is a measure of a

position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, u(t), wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t),$$

where S(f(x(t))) represents a restoring force; and outputting the third signal u(t).

25. A method of generating an output signal from a compensator for controlling an audio reproduction system, the method comprising:

providing to the compensator a first time-dependent signal w(t);

providing to the compensator a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the audio reproduction system with respect to a second portion of the audio reproduction system;

modifying the first input signal as a function of the second input signal by using a control law to produce a third signal, u(t), wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t),$$

where S(f(x(t))) represents a restoring force; and outputting the third signal u(t).

26. The process according to Claim 23, wherein the function S(f(x(t))) is derived in part from a position-dependent

restoring force acting upon an element of the actuator.

27. The process according to Claim 26, wherein S(f(x(t))) is the subtracted version represented by equation (36a).

28. The process according to Claim 24, wherein the function S(f(x(t))) is derived in part from a position-dependent restoring force acting upon an element of the electromechanical device.

29. The process according to Claim 28, wherein S(f(x(t))) is the subtracted version represented by equation (36a).

30. The process according to Claim 25, wherein S(f(x(t))) is derived from a ratio of the voice-coil restoring force to a motor factor of the voice-coil.

31. The process according to Claim 30, wherein S(f(x(t))) is the subtracted version represented by equation (36a).

32. A method of generating an output signal from a compensator for controlling an actuator, the method comprising:

providing to the compensator a first time-dependent signal, w(t);

providing to the compensator a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator;

modifying the first input signal as a function of the position-dependent signal using a control law to produce a third signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+Z(f(x(t)))* d(w(t))/dt,$$

where Z(f(x(t))) is a function Z(.) of f(x(t)), and d(w(t))/dt is the time derivative of w(t); and

outputting the signal u(t).

33. A method of generating an output signal from a compensator for controlling an electromechanical device, the method comprising:

providing to the compensator a first time-dependent signal, w(t);

providing to the compensator a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device;

modifying the first input signal as a function of the position-dependent signal using a control law to produce a third signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+Z(f(x(t)))* d(w(t))/dt,$$

where Z(f(x(t))) is a function Z(.) of f(x(t)), and d(w(t))/dt is the time derivative of w(t); and

outputting the signal u(t).

34. A method of generating an output signal from a compensator for controlling a voice coil audio transducer, the method comprising:

providing to the compensator a first time-dependent signal, w(t);

providing to the compensator a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the audio transducer with respect to a second portion of the audio transducer;

modifying the first input signal as a function of the position-dependent signal using a control law to produce a third signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+Z(f(x(t)))* d(w(t))/dt,$$

where Z(f(x(t))) is a function Z(.) of f(x(t)), and d(w(t))/dt is the time derivative of w(t); and

outputting the signal u(t).

35. The method according to Claim 32 where Z(.) is derived from the impedance of the actuator.

36. The method according to Claim 33 where Z(.) is derived from the impedance of the electromechanical device.

37. The method according to Claim 34 where Z(.) is derived from the impedance of a transducer voice coil.

38. A method of generating an output signal from a compensator for controlling an actuator, the method comprising:

providing to the compensator a first time-dependent signal, w(t);

providing to the compensator a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator;

modifying the first input signal as a function of the position-dependent signal using a control law to produce a third signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+B1(f(x(t)))* d(F(f(x(t))))/dt,$$

where B1(.) and F(.)are functions of f(x(t)), and d(F(f(x(t))))/dt is the time derivative of the composite function F(f(x(t))); and

outputting a third signal based on the result u(t).

39. A method of generating an output signal from a compensator for controlling an electromechanical device, the method comprising:

providing to the compensator a first time-dependent

signal, w(t);

providing to the compensator a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device;

modifying the first input signal as a function of the position-dependent signal using a control law to produce a third signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+B1(f(x(t)))* d(F(f(x(t))))/dt,$$

where B1(.) and F(.)are functions of f(x(t)), and d(F(f(x(t))))/dt is the time derivative of the composite function F(f(x(t))); and

outputting a third signal based on the result u(t).

40. A method of generating an output signal from a compensator for controlling a voice coil audio transducer, the method comprising:

providing to the compensator a first time-dependent signal, w(t);

providing to the compensator a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the audio transducer with respect to a second portion of the audio transducer;

modifying the first input signal as a function of the position-dependent signal using a control law to produce a third signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+B1(f(x(t)))* d(F(f(x(t))))/dt,$$

where B1(.) and F(.)are functions of f(x(t)), and d(F(f(x(t))))/dt is the time derivative of the composite function F(f(x(t))); and

outputting a third signal based on the result u(t).

41. The method according to Claim 38 wherein B1(f(x(t))) is derived from a motor factor of the actuator, and F(f(x(t))) is an estimate of a relative position of a first portion of the actuator with respect to a second portion of the actuator, and where the estimate is derived from a position-indicator actuator generalized coordinate f(x(t)).

42. The method according to Claim 38, wherein the function B1(.) is comprised of:

a first portion derived from a non-linear motor factor of the actuator;

a second portion which represents an adjustable, approximately linear damping; and

wherein the resultant function, B1(.) is comprised of the second portion subtracted from the first portion.

43. The method according to Claim 39, wherein B1(f(x(t))) is derived from a motor factor of the electromechanical device; wherein F(f(x(t))) is an estimate of a relative position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device derived from a position-indicator generalized coordinate f(x(t)) of the electromechanical device; and further wherein x(t) is said relative position.

44. The method according to Claim 39, wherein the function B1(.) is comprised of:

a first portion derived from a non-linear motor factor of the actuator;

a second portion which represents an adjustable, approximately linear damping; and

wherein the resultant function, B1(.) is comprised of the second portion subtracted from the first portion.

45. The method according to Claim 40, wherein the voice

coil audio transducer comprises a voice coil and an associated diaphragm, wherein B1(f(x(t))) is derived from a motor factor of the voice coil audio transducer and F(f(x(t))) is an estimate of position of the coil and associated diaphragm derived from a position-indicator generalized coordinate f(x(t)) of the audio transducer, and wherein x(t) is the position of the coil and associated diaphragm with respect to another portion of the transducer.

46. The method according to claim 40, where the function B1(.) comprises:

a first portion derived from a non-linear motor factor of the actuator;

a second portion which represents an adjustable, approximately linear damping; and

wherein the resultant function, B1(.) is comprised of the second portion subtracted from the first portion.

47. The method according to claim 46, wherein the second portion is derived from the equation:

p*BL(0)*BL(0)/BL(f(x(t))),

where p is an adjustable constant;

where BL(0) is a motor factor of the voice coil and associated diaphragm when no drive signal is applied to the voice coil; and

BL(f(x(t))) is a position-dependent nonlinear motor factor.

48. The method according to claim 34, wherein the first time-dependent signal w(t) is an audio program transducer input.

49. The method according to claim 40, wherein the first time-dependent signal w(t) is an audio program transducer input.

50. A compensator for generating an actuator control

signal, the compensator comprising circuitry for:

receiving a first time-dependent signal $w(t)$;

receiving a second, position-dependent signal $f(x(t))$, where $x(t)$ is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator; and

modifying the first input signal as a function of the second input signal by using a control law to produce the actuator control signal, $u(t)$, wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t)B(f(x(t))) ,$$

where $S(f(x(t)))$ represents a restoring force and $B(f(x(t)))$ represents a motor factor, and both are univariate functions.

51. A compensator for generating a control signal for an electromechanical device, the compensator comprising circuitry for:

receiving a first time-dependent signal $w(t)$;

receiving a second, position-dependent signal $f(x(t))$, where $x(t)$ is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device; and

modifying the first input signal as a function of the second input signal by using a control law to produce the control signal, $u(t)$, wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t)B(f(x(t))) ,$$

where $S(f(x(t)))$ represents a restoring force and $B(f(x(t)))$ represents a motor factor, and both are univariate functions.

52. A compensator for generating a control signal for an audio reproduction system, the compensator comprising circuitry for:

receiving a first time-dependent signal w(t);

receiving a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the audio reproduction system with respect to a second portion of the audio reproduction system; and

modifying the first input signal as a function of the second input signal by using a control law to produce the control signal, u(t), wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t)B(f(x(t))) ,$$

where S(f(x(t))) represents a restoring force and B(f(x(t))) represents a motor factor, and both are univariate functions.

53. The compensator according to Claim 50, wherein the circuitry modifying the first input signal as a function of the second input signal derives the function S(f(x(t))) at least in part from a position-dependent restoring force acting upon an element of the actuator.

54. The compensator according to Claim 53, wherein the circuitry deriving S(f(x(t))) implements the subtracted version represented by equation (36a).

55. The compensator according to Claim 51, wherein the circuitry modifying the first input signal as a function of the second input signal derives the function S(f(x(t))) at least in part from a position-dependent restoring force acting upon an element of the electromechanical device.

56. The compensator according to Claim 55, wherein the circuitry for deriving S(f(x(t))) implements the subtracted version represented by equation (36a).

57. The compensator according to Claim 52, wherein the audio reproduction system includes a voice-coil, wherein the circuitry modifying the first input signal as a function of the second input signal derives S(f(x(t))) from a ratio of a voice-coil restoring force to a motor factor of the voice-coil.

58. The compensator according to Claim 57, wherein the circuitry for deriving S(f(x(t))) implements the subtracted version represented by equation (36a).

59. The compensator according to Claim 50, wherein the circuitry modifying the first input signal as a function of the second input signal derives B(f(x(t))) as a function of a motor factor of the actuator.

60. The compensator according to Claim 59, wherein the actuator motor factor is a drive force acting upon an element of the actuator for a fiducial value of an electric current driving the actuator.

61. The compensator according to Claim 51, wherein the circuitry modifying the first input signal as a function of the second input signal derives B(f(x(t))) as a function of a motor factor of the electromechanical device.

62. The compensator according to Claim 61, wherein the motor factor of the electromechanical device is the electromagnetic drive force acting upon an element of the electromechanical device for a fiducial value of the electric current driving the electromechanical device.

63. The compensator according to Claim 52, wherein the audio reproduction system includes a voice coil transducer, and further wherein the circuitry modifying the first input signal as a function of the second input signal derives B(f(x(t))) as a function of a motor factor of the voice coil transducer.

64. A compensator for generating an actuator control signal, the compensator comprising circuitry for:

receiving a first time-dependent signal w(t);

receiving a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator; and

modifying the first input signal as a function of the second input signal by using a control law to produce the actuator control signal, u(t), wherein the modifying implements the following control law:

$$u(t) = w(t)B(f(x(t))),$$

where B(f(x(t))) represents a motor factor.

65. A compensator for generating a control signal for an electromechanical device, the compensator comprising circuitry for:

receiving a first time-dependent signal w(t);

receiving a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device; and

modifying the first input signal as a function of the second input signal by using a control law to produce the control signal, u(t), wherein the modifying implements the following control law:

$$u(t) = w(t)B(f(x(t))),$$

where B(f(x(t))) represents a motor factor.

66. A compensator for generating a control signal for an audio reproduction system, the compensator comprising circuitry for:

receiving a first time-dependent signal w(t);

receiving a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the audio reproduction system with respect to a second portion of the audio reproduction system; and

modifying the first input signal as a function of the second input signal by using a control law to produce the control signal, u(t), wherein the modifying implements the following control law:

$$u(t) = w(t)B(f(x(t))),$$

where B(f(x(t))) represents a motor factor.

67. The compensator according to Claim 64, wherein the circuitry modifying the first input signal as a function of second input signal derives B(f(x(t))) from a motor factor of the actuator.

68. The compensator according to Claim 67, wherein the actuator motor factor is a drive force acting upon an element of the actuator for a fiducial value of an electric current driving the actuator.

69. The compensator according to Claim 66, wherein the circuitry modifying the first input signal as a function of the second input signal derives B(f(x(t))) from a motor factor of

the electromechanical device.

70. The compensator according to Claim 69, wherein the motor factor of the electromechanical device is the electromagnetic drive force acting upon an element of the electromechanical device for a fiducial value of the electric current driving the electromechanical device.

71. The compensator according to Claim 66, wherein the audio reproduction system includes a voice coil transducer, and further wherein the circuitry modifying the first input signal as a function of the second input signal derives B(f(x(t))) from a motor factor of the voice coil transducer.

72. A compensator for generating an actuator control signal, the compensator comprising circuitry for:

receiving a first time-dependent signal w(t);

receiving a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator; and

modifying the first input signal as a function of the second input signal by using a control law to produce the actuator control signal, u(t), wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t),$$

where S(f(x(t))) represents a restoring force.

73. A compensator for generating a control signal for an electromechanical device, the compensator comprising circuitry for:

receiving a first time-dependent signal w(t);

receiving a second, position-dependent signal f(x(t)),

where x(t) is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device; and

modifying the first input signal as a function of the second input signal by using a control law to produce the control signal, u(t), wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t),$$

where S(f(x(t))) represents a restoring force.

74. A compensator for generating a control signal for an audio reproduction system, the compensator comprising circuitry for:

receiving a first time-dependent signal w(t);

receiving a second, position-dependent signal f(x(t)), where x(t) is a measure of a position of a first portion of the audio reproduction system with respect to a second portion of the audio reproduction system; and

modifying the first input signal as a function of the second input signal by using a control law to produce the control signal, u(t), wherein the modifying implements the following control law:

$$u(t) = S(f(x(t))) + w(t),$$

where S(f(x(t))) represents a restoring force.

75. The compensator according to Claim 72, wherein the circuitry modifying the first input signal as a function of the second input signal derives the function S(f(x(t))) at least in part from a position-dependent restoring force acting upon an element of the actuator.

76. The compensator according to Claim 75, wherein the circuitry modifying the first input signal as a function of the second input signal derives S(f(x(t))) in accordance with the subtracted version of S(f(x(t))) represented by equation (36a).

77. The compensator according to Claim 73, wherein the circuitry modifying the first input signal as a function of the second input signal derives S(f(x(t))) at least in part from a position-dependent restoring force acting upon an element of the electromechanical device.

78. The compensator according to Claim 77, wherein the circuitry modify the first input signal as a function of the second input signal derives S(f(x(t))) in accordance with the subtracted version of S(f(x(t)))represented by equation (36a).

79. The compensator according to Claim 74, wherein the audio reproduction system includes a voice coil and further wherein the circuitry modifying the first input signal as a function of the second input signal derives S(f(x(t))) at least in part from a ratio of a voice-coil restoring force to a motor factor of the voice-coil.

80. The compensator according to Claim 79, wherein the circuitry modifying the first input signal as a function of the second input signal derives S(f(x(t))) in accordance with the subtracted version of S(f(x(t))) as represented by equation (36a).

81. A compensator for generating an actuator control signal, the compensator comprising circuitry for:

receiving a first time-dependent signal, w(t);

receiving a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the actuator with respect to a second portion of

the actuator; and

modifying the first input signal as a function of the position-dependent signal using a control law to produce the control signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+Z(f(x(t)))* d(w(t))/dt,$$

where Z(f(x(t))) is a function Z(.) of f(x(t)), and d(w(t))/dt is the time derivative of w(t).

82. A compensator for generating a control signal for an electromechanical device, the compensator comprising circuitry for:

receiving a first time-dependent signal, w(t);

receiving a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device; and

modifying the first input signal as a function of the position-dependent signal using a control law to produce the control signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+Z(f(x(t)))* d(w(t))/dt,$$

where Z(f(x(t))) is a function Z(.) of f(x(t)), and d(w(t))/dt is the time derivative of w(t).

83. A compensator for generating a control signal for a voice coil audio transducer, the compensator comprising circuitry for:

receiving a first time-dependent signal, w(t);

receiving a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the audio transducer with respect to a second portion of the audio transducer; and

modifying the first input signal as a function of the position-dependent signal using a control law to produce

the control signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+Z(f(x(t)))* d(w(t))/dt,$$

where Z(f(x(t))) is a function Z(.) of f(x(t)), and d(w(t))/dt is the time derivative of w(t).

84. The compensator according to Claim 81, wherein the circuitry modifying the first signal as a function of the position-dependent signal derives Z(.) from an impedance of the actuator.

85. The compensator according to Claim 82, wherein the circuitry modifying the first signal as a function of the position-dependent signal derives Z(.)from an impedance of the electromechanical device.

86. The compensator according to Claim 83, wherein the circuitry modifying the first signal as a function of the position-dependent signal derives Z(.)from an impedance of a transducer voice coil.

87. A compensator for generating a control signal for an actuator, the compensator comprising circuitry for:

receiving a first time-dependent signal, w(t);

receiving a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the actuator with respect to a second portion of the actuator; and

modifying the first input signal as a function of the position-dependent signal using a control law to produce the control signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+B1(f(x(t)))* d(F(f(x(t))))/dt,$$

where B1(.) and F(.)are functions of f(x(t)), and d(F(f(x(t))))/dt is a time derivative of the composite

function F(f(x(t))).

88. A compensator for generating a control signal for an electromechanical device, the compensator comprising circuitry for:

receiving a first time-dependent signal, w(t);

receiving a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device; and

modifying the first input signal as a function of the position-dependent signal using a control law to produce the control signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+B1(f(x(t)))* d(F(f(x(t))))/dt,$$

where B1(.) and F(.)are functions of f(x(t)), and d(F(f(x(t))))/dt is the time derivative of the composite function F(f(x(t))).

89. A compensator for generating a control signal for a voice coil audio transducer, the compensator comprising circuitry for:

receiving a first time-dependent signal, w(t);

receiving a second, position-dependent signal, f(x(t)), where x(t) is a measure of a position of a first portion of the audio transducer with respect to a second portion of the audio transducer; and

modifying the first input signal as a function of the position-dependent signal using a control law to produce the control signal, u(t), where the modifying implements the following control law:

$$u(t)= w(t)+B1(f(x(t)))* d(F(f(x(t))))/dt,$$

where B1(.) and F(.)are functions of f(x(t)), and d(F(f(x(t))))/dt is the time derivative of the composite function F(f(x(t))).

90. The compensator according to Claim 87, wherein the circuitry modifying the first signal as a function of the position-dependent signal derives B1(f(x(t))) from a motor factor of the actuator, and further wherein F(f(x(t))) is an estimate of a relative position of a first portion of the actuator with respect to a second portion of the actuator, and where the estimate is derived from a position-indicator actuator generalized coordinate f(x(t)).

91. The compensator according to Claim 87, wherein the function B1(.) is comprised of a first portion derived from a non-linear motor factor of the actuator minus a second portion which represents an adjustable, approximately linear damping.

92. The compensator according to Claim 88, wherein the circuitry modifying the first signal as a function of the position-dependent signal derives B1(f(x(t))) from a motor factor of the electromechanical device; wherein F(f(x(t))) is an estimate of a relative position of a first portion of the electromechanical device with respect to a second portion of the electromechanical device derived from a position-indicator generalized coordinate f(x(t)) of the electromechanical device; and further wherein x(t) is the relative position.

93. The compensator according to Claim 88, wherein the function B1(.) is comprised of a first portion derived from a non-linear motor factor of the actuator minus a second portion which represents an adjustable, approximately linear damping.

94. The compensator according to Claim 89, wherein the voice coil audio transducer comprises a voice coil and an associated diaphragm, wherein the circuitry modifying the first signal as a function of the position-dependent signal derives B1(f(x(t))) from a motor factor of the voice coil audio

transducer and F(f(x(t))) is an estimate of position of the coil and associated diaphragm derived from a position-indicator generalized coordinate f(x(t)) of the audio transducer, and wherein x(t) is the position of the coil and associated diaphragm with respect to another portion of the transducer.

95. The compensator according to claim 89, where the function B1(.) comprises a first portion derived from a non-linear motor factor of the actuator minus a second portion which represents an adjustable, approximately linear damping.

96. The compensator according to claim 95, wherein the circuitry modifying the first signal as a function of the position-dependent signal derives the second portion from the equation:

$$p*BL(0)*BL(0)/BL(f(x(t))),$$

where p is an adjustable constant;

where BL(0) is a motor factor of the voice coil and associated diaphragm when no drive signal is applied to the voice coil; and

BL(f(x(t))) is a position-dependent nonlinear motor factor.

97. The compensator according to claim 83, wherein the first time-dependent signal w(t) is an audio program transducer input.

98. The compensator according to claim 89, wherein the first time-dependent signal w(t) is an audio program transducer input.